

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF AGRICULTURE  
BUREAU OF CHEMISTRY

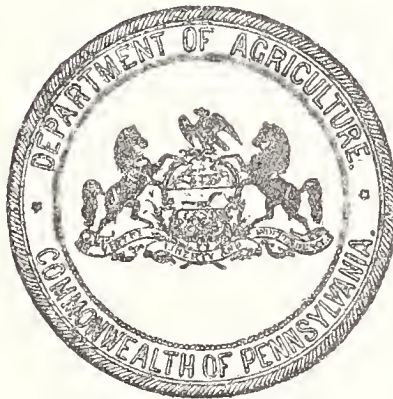
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BULLETIN No. 294.

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LIME REPORT  
1916

JAMES W. KELLOGG,  
Chief Chemist



Published by Direction of Secretary of Agriculture  
CHARLES E. PATTON

HARRISBURG, PA.:  
WM. STANLEY RAY, STATE PRINTER.  
1917



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## LETTER OF TRANSMITTAL.

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### DEPARTMENT OF AGRICULTURE BUREAU OF CHEMISTRY

Harrisburg, Pa., March 5, 1917.

Hon. Charles E. Patton,  
Secretary of Agriculture,  
Harrisburg, Pa.

Dear Sir: I have the honor to transmit herewith for your approval a report of the work performed by this Bureau showing the results of analyses of the samples of Lime Products received from Sampling Agents during 1916, the first year of the enforcement of the Lime Law.

It is recommended that this report be published in bulletin form for distribution.

Very respectfully,

JAMES W. KELLOGG,  
Chief Chemist.



# LIME REPORT

1916

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## INTRODUCTION.

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During 1916, the first year of the enforcement of the Lime Law, 188 samples of Lime Products were received from the official Sampling Agents which were collected during the Spring and Fall seasons. Of this number, 163 samples representing brands registered with the Department were analyzed for the purpose of determining whether or not they were correctly guaranteed as required. The classes or kinds of products listed and the number in each class were as follows:

Pulverized Limestone, 31; Artificial Carbonate of Lime, 21; Marl, 6; Hydrated Lime, 72; Gypsum or Land Plaster, 4, and 1 sample classified as miscellaneous. There were 77 different brands registered by 66 companies, 40 of these firms being located in Pennsylvania, the remaining number being located in neighboring States. The results of analyses of each sample have been classified and arranged in tables which follow showing the composition, together with the guarantees of the several brands offered for sale in the State. The guarantees included correspond with those registered with the Department and in the main with those found printed upon the sacks from which the samples were taken, or attached cards or furnished by the selling agents. All of the samples were analyzed for Calcium Oxide, Magnesium Oxide and Insoluble Matter and in the case of Pulverized Limestone and Artificial Carbonate of Lime, the samples were subjected to the processes of screening to determine the size or number of sieve mesh through which the coarsest particles would pass and also what portion would pass a No. 10, No. 50 and No. 100 mesh sieve. In the case of Gypsum or Land Plaster, determinations were also made for sulphur trioxide. These results of analyses are shown in detail in the tables which follow. For the purpose of making a comparison of the results of analyses, together with guarantees and selling prices, the samples of Pulverized Limestone, Artificial Carbonate of Lime and Marl were placed together in Table No. I. The analyses of the samples of Limestone and Hydrated Lime in Table No. II. Gypsum or Land Plaster in Table No. III and the analysis of the miscellaneous sample is shown in Table No. IV.

Reports of the results of analyses were sent to the manufacturers and to the dealers or parties from whom each sample was secured.

Many of the samples upon analysis did not meet their guarantees which is frequently the case when products are placed upon the market under new conditions where formerly guarantees were not required. The number of deficiencies will, undoubtedly, be reduced to a minimum after the producers have, as a result of the analyses of many samples, become more familiar with the character or composition of their products. Guarantees which are too high will be changed or corrected for future shipments. In the case of Lime, the composition will change somewhat upon long standing due to the absorption of moisture and carbon dioxide from the atmosphere.

Under the provisions of the Lime Law for the analysis of special samples for the fee of \$1.00, 41 samples were analyzed during the year and reports returned to those submitting these samples. The fees received were paid to the State Treasurer as required.

A copy of the Lime Law is included and follows in this report, which gives in detail the requirements necessary in selling Lime Products in the State and which also defines the several classes or kinds of these products.

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## ACKNOWLEDGMENTS.

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The chemical analyses of the samples were made by Messrs. J. E. Shull, William Weber and F. J. Holben. Preparation of samples for analyses by W. E. Huber and P. H. Fairlamb. Mr. V. B. Hausknecht had charge of the reception of samples, immediate supervision of analytical work and making check determinations where necessary.



## LIME LAW.

No. 306.

## AN ACT

To regulate the sale for agricultural purpose of crushed limestone, lime, gypsum, and related products; defining said products; and prescribing penalties for the violation of this act.

Section 1. Be it enacted, &c., That every bag, barrel, or other package or quantity, of any pulverized limestone, ground oyster shells, artificial carbonate of lime, ground lime, spraying lime, slacked-lime, hydrated lime, hydrated spraying lime, marl, gypsum, or land-plaster, sold, offered, or exposed for sale, within this Commonwealth for use as a soil amendment or as an ingredient or reagent in the preparation of any fungicide or insecticide, shall have attached to it or be accompanied, in a manner provided in section three hereof, by a plainly printed statement giving the name and address of the manufacturer or importer and his place of business, the brand or trade-name of said material, the net weight of the contents of the package, when sold in package, and a statement declaring, with respect to pulverized limestone, ground oyster shells, and artificial carbonate of lime: (a) The degree of fineness of the material, in terms of the minimum sieve-mesh, expressed in fractions of an inch, through which the coarsest particles of said material can pass; and (b) the minimum percentages contained of available oxides of calcium and magnesium, respectively, combined as carbonates; with respect to lime, ground lime, spraying lime, slaked-lime, hydrated lime, hydrated spraying lime, and marl, the minimum percentages contained of the available oxids of calcium and magnesium, respectively; and with respect to gypsum, or land-plaster, the minimum percentages contained of available calcium oxide and sulphur trioxide, or sulphuric acid ( $\text{SO}^3$ ) respectively; which statement shall be held to be the guaranty of the manufacturer or importer that the goods to which said statement refers are of the kind and quality, or composition and fineness, so set forth. The provisions of this act shall not, however, apply to air-slaked lime, kiln-slaks, gas-house lime, or tanners' lime, when sold as such.

Section 2. For the purpose of this act, the materials named in the foregoing section are defined as follows:—

(1) Limestone is the rock commonly known by that name, and consisting chiefly of calcium carbonate, or of said carbonate with a smaller molecular proportion of magnesium carbonate.

(2) Pulverized limestone is limestone reduced by mechanical means to a fine powder.

(3) Artificial carbonate of lime is carbonate of lime artificially produced by any method other than the exposure of lime, ground lime, slaked-lime, hydrated lime, or spraying lime to the action of the atmosphere.

(4) Lime is the product obtained by the complete burning of limestone in a kiln, and capable of being reduced by slaking to a fine powder.

(5) Ground lime is lime reduced to a fine powder by grinding.

(6) Spraying lime is lime of high purity, containing not less than ninety-three per centum of calcium oxide and not more than five per centum of magnesium oxide, not more than five per centum of carbon dioxide, nor more than five per centum of acid insoluble matters, iron or aluminum oxides, collectively.

(7) Slaked-lime is the dry finely divided product obtained by the addition of water to lime.

(8) Hydrated lime is slaked-lime prepared by the aid of stirring, or of stirring, grinding, and screening machinery, and is free from hard lumps.

(9) Hydrated spraying lime is dry finely divided hydrated lime of purity not less, after taking the water of hydration into account, than that herein required in the case of spraying lime, and of such fineness that all shall pass a standard sieve of one hundred meshes to the inch.

(10) Air-slaked lime is the more or less finely divided product obtained when lime, slaked-lime, hydrated lime, or spraying lime is exposed for a considerable time to the action of the air.

(11) Marl is clay highly charged with carbonate of lime. Shell marl is marl in which the carbonate of lime is present chiefly in the form of molluscan shells.

(12) Gypsum, or land-plaster, is the finely divided mineral, commonly known by that name, and consisting chiefly of calcium sulphate.

(13) Kiln-slaks is refuse lime mixed with ashes and "core," or imperfectly burned limestone.

(14) Gas-house lime is spent lime that has been used as a purifier in the manufacture of illuminating gas.

(15) Tanner's lime is spent lime that has been used in the curing of hides.

Section 3. The statement required by section one of this act shall, in the case of goods sold in package, be plainly printed upon the package, or upon a tag or label fastened thereto, of such quality and in such manner that it shall not be detached in handling, and, in

the case of goods sold in bulk, the said statement shall be delivered to the purchaser either with the invoice therefor or with the goods.

Section 4. Every manufacturer or importer of one or more of the materials named in section one of this act, for either or both of the purposes therein stated, shall, on or before the first day of January of each year, or before offering them for sale in this Commonwealth for either of said purposes, file annually with the Secretary of Agriculture a statement of the names and number of brands of such materials having distinct trade-names that he shall offer for sale, for either or both of said purposes, during the next ensuing calendar year or remainder thereof, together with a copy of the statement declaring the composition of these several brands of said materials, as required by section one of this act.

Section 5. In addition to the statement required by section four of this act, every manufacturer or importer of any of the materials named in section one of this act shall on or before the first day of January of each year, or before offering them for sale within this Commonwealth, file annually with the Secretary of Agriculture an affidavit showing, as nearly as practicable, the weight of each brand of said materials sold by him, or, if the producer or vendor be a firm or corporation, by its managers, officers, and agents, within the Commonwealth, for either or both of the purposes named in section one of this act, during the last preceding year; and for each brand so sold he shall pay to the Secretary of Agriculture a license fee, according to the weight sold, as follows: For an amount exceeding one hundred tons, but not exceeding one thousand tons, five dollars; for an amount exceeding one thousand tons, but not exceeding five thousand tons, ten dollars; and for an amount exceeding five thousand tons, twenty dollars; and when said fees shall have been paid, and the statements required by section four of this act have been filed with the Secretary of Agriculture, the party or parties who have made such payment, and otherwise complied with the provisions of this act, shall be entitled to sell within the Commonwealth the goods specified in said statement and covered by said fees during the year, or fraction of a year, immediately following said statement. If the manufacturer or importer shall not have made during the preceding year any sales within the Commonwealth, for the aforesaid purposes, of any brand to be offered for sale during the year for which the fee is to be paid, he shall pay for each such brand a fee of five dollars. All moneys so received shall be immediately paid by the Secretary of Agriculture into the State Treasury, for the use of the Commonwealth.

Section 6. Any person or persons selling, offering, or exposing for sale, for either of the purposes stated in section one of this act, any of the materials named therein or brand of the same, unless accompanied

by the statement required by section one of this act, or, when so accompanied, if the said statements shall be false in any particular, or without having complied with all the foregoing provisions of this act, shall be guilty of a misdemeanor; and on conviction shall be sentenced to pay a fine of not less than ten nor more than fifty dollars for the first offense, and not less than one hundred dollars for each subsequent offense. It shall be the duty of the Secretary of Agriculture to enforce the provisions of this act; and all penalties, costs, and fines recovered shall be paid to him or his duly authorized agent, and by him shall be immediately paid into the State Treasury, for the use of the Commonwealth.

Section 7. The Secretary of Agriculture is hereby empowered to collect samples of the materials named in section one of this act, either in person or by his duly qualified agent or representative, to have them analyzed, and to publish the results for the information of the public; and for this purpose the said Secretary of Agriculture, such assistants, agents, experts, chemists, detectives, and counsel as he shall duly authorize, shall have full access, ingress, and egress to and from all places of business, quarries, kilns, factories, barns, buildings, carriages, cars, and vessels used in the manufacture, storage, transportation, or sale of any of the said materials. They shall also have power to open any package or vessel containing or supposed to contain any of the said materials, and to take therefrom samples for analysis, upon tendering the value of said samples. Any manufacturer or producer of any of the materials named in section one of this act, located in the Commonwealth, shall be entitled to have a single sample of any distinct brand, for the sale of which he has paid the fee required by section five of this act, analyzed by the Department of Agriculture, under such regulations as the Secretary of Agriculture may prescribe with respect to the points of composition specified in said section one, upon sending sample properly sealed and carriage prepaid, together with a fee of one dollar for each such analysis; but not more than two brands shall be analyzed, under the privilege conferred by this proviso, for one manufacturer or producer in a single year. None of the provisions of this act shall apply to sales of limestone, or limestone products or marl, when such sales are made at the quarry or pit in bulk, and delivered to the wagons of the users, who are presumed to be acquainted with the qualities of the local products.

Section 8. To carry out the provisions of this act for the period ending June first, one thousand nine hundred and seventeen, the sum of four thousand dollars (\$4,000), or so much thereof as may be necessary, is hereby specifically appropriated to the Department of Agriculture.



Section 9. This act shall go into effect on the first day of January, one thousand nine hundred and sixteen.

Approved—The 1st day of June, A. D. 1915.

MARTIN G. BRUMBAUGH.

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## REGISTRATION

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Applications for the registration and sale of lime products in the State for agricultural purposes should be made direct to the Secretary of Agriculture, Hon. Charles E. Patton, Harrisburg, Pa. It is necessary to file an affidavit with the Department on or before January 1st of each calendar year and pay a license fee of from Five Dollars (\$5.00) to Twenty Dollars (\$20.00), according to the number of tons sold during a preceeding year. Before lime products are offered for sale, therefore, producers should consult Sections 4 and 5 of the law and communicate with the Secretary of Agriculture.

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## REQUIRED LABELING

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The requirements of the Law with respect to labeling are as follows: Except in the case of air-slaked lime, kiln-slaks, gas-house lime and tanners' lime, when sold as such, all sacks or containers or attached cards, are required to be printed, or if sold in bulk, a statement delivered to the purchasers, showing the number of net pounds, brand name or name of product, name and address of Manufacturer or Importer and guaranteed analysis. The guarantees required vary for each class of lime product and minimum guarantees only should be used as the use of both minimum and maximum, or so called "sliding guarantees" are considered contrary to the requirements. The guarantees required for each class of products are as follows:—

Pulverized limestone, ground oyster shells and artificial carbonate of lime: Minimum guarantees for calcium oxide and its equivalent

as calcium carbonate; magnesium oxide and its equivalent as magnesium carbonate, and the degree of fineness showing the number of sieve mesh through which the coarsest particles will pass.

Lime, ground lime, spraying lime, slaked lime, hydrated lime, hydrated spraying lime and marl. Guarantees for the minimum percentages of calcium oxide and magnesium oxide.

Gypsum or Land Plaster: Guarantees for the minimum percentages of calcium oxide and sulphur trioxide.

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## ANALYSES OF SPECIAL SAMPLES

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Under certain conditions the Department will analyze special samples of lime products for residents of the State, as provided for by the Law, for the fee of \$1.00 per sample. Parties wishing to take advantage of this provision should first write to the Department making a request for the analysis of a sample and fill out and return a blank form which will be sent, together with the amount of fee charged and then should proceed as follows:

*Amount of Sample:*—Portions should be carefully taken from several sacks of the shipment, or if in bulk, from several different places and carefully mixed to insure as uniform and as representative a sample as can be obtained. After thoroughly mixing, at least a one pound sample should be placed in a suitable container and sent to the Department.

*Charge for Analysis:*—A charge of One Dollar (\$1.00) is made for each sample analyzed, determinations being made for calcium oxide, magnesium oxide and insoluble matter. The fee should be sent in the form of a check, money order or cash.

*Address:*—Both sample and letter enclosing fee and filled out form should be sent to the Bureau of Chemistry, Pennsylvania Department of Agriculture, Box R, Harrisburg, Pa.. The name of the sender should be plainly written on the package containing sample. If more than one sample is submitted, each should be identified by a number, letter or name.

## AVERAGE ANALYSES AND RETAIL PRICES

Each class or group of the samples analyzed have been placed together and an average made of the results of analyses and retail prices for each of these classes. In order that these averages may be readily compared, the following table has been prepared.

Classes of Lime Products.	Number of samples.	Moisture.	Calcium oxide.	Magnesium oxide.	Sulphur trioxide.	Insoluble matter.	Price per ton.
		Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	
Pulverized limestone, .....	31	0.15	45.67	4.76	.....	7.57	\$4.14
Artificial carbonate of lime, .....	21	0.53	50.44	2.68	.....	1.49	6.34
Marl, .....	6	2.64	46.03	1.36	.....	6.05	5.79
Lime, .....	28	.....	72.35	4.18	.....	4.31	4.72
Hydrated lime, .....	72	.....	62.16	9.09	.....	2.56	7.26
Gypsum, .....	4	6.89	33.24	.....	48.19	9.71	12.00

## DISCUSSION OF RESULTS OF INSPECTION

The analyses of the several classes of lime products represented by samples received during the year consisted of making determinations for the percentages of calcium and magnesium oxides and insoluble matter. In the case of lime or burned limestone, determinations were made for carbon dioxide which indicates how completely the limestone has been burned and to what extent the unburned limestone or "core" remains. The insoluble matter shows the amount of impurities in the form of sand or silica. In the case of gypsum or land plaster, which is essentially calcium sulphate, the amount of calcium oxide and sulphur trioxide were determined. Agricultural lime in its several forms is used for the purpose of correcting soil acidity, as well as to enhance the mechanical condition of certain soils and to assist in rendering plant foods more available. As calcium and magnesium in their caustic form as oxides are the elements which are active in producing the desired results, the amounts of

these substances in lime products are, therefore, determined and considered in estimating their character and value. The samples included in this report, in addition to the one miscellaneous sample, which was a mixture of pulverized limestone and hydrated lime, were of 6 classes of follows: Pulverized Limestone, Artificial Carbonate of Lime, Marl, Lime, Hydrated Lime and Gypsum or Land Plaster.

There were 31 samples of Pulverized Limestone which is "limestone reduced by mechanical means to a fine powder," received and analyzed during the year which varied considerably in their composition. The average results were as follows: Calcium oxide 45.67 per cent. equivalent to calcium carbonate 81.50 per cent.; magnesium oxide 4.76 per cent. equivalent to magnesium carbonate 9.93 per cent. Insoluble matter 7.57 per cent. The average sieve mesh through which the coarsest particles would pass was No. 15, 99.1 per cent. passed No. 10 mesh sieve, 81.6 per cent. passed No. 50 mesh sieve and 69.7 per cent. passed No. 100 mesh sieve. The average selling price was \$4.14. The value of pulverized limestone is, in a large measure, proportional to its degree of fineness and, therefore, the better grades should show a large percentage passing the finer mesh sieves. Limestone when pure is calcium carbonate containing 56 per cent. of calcium oxide and 44 per cent. of carbon dioxide. The ordinary commercial forms of limestone, however, contain from traces up to 40 per cent. of magnesium, in the form of carbonates which when present in this latter amount are dolomite limestones. Other elements are also present in varying amounts including iron, alumina and silica. It will be noted that pulverized limestone contains approximately 44 per cent. of carbon dioxide and, therefore, will not contain more than 56 per cent. of calcium and magnesium oxides, the substances which are of value in correcting soil acidity. The sample having the lowest amount of calcium oxide was from a dolomite deposit showing 28.43 per cent. with 18.22 per cent. magnesium oxide. The one containing the highest amount of calcium oxide analyzed 54.14 per cent. The amount of insoluble matter ranged from 10 per cent. to 15.20 per cent. and the selling price varied from \$2.50 to \$7.00 per ton.

The number of samples classified as Artificial Carbonate of Lime was 21. This form of lime product is "carbonate of lime artificially produced by any method other than the exposure of lime, ground lime, slacked-lime, hydrated lime or spraying lime, to the action of the atmosphere." It is obtained as a by-product from manufacturing processes and has approximately the same composition as pulverized limestone, it being calcium carbonate in a prepared form. The in-



soluble matter in this class is lower than in pulverized limestone, the average in the samples analyzed being 1.49 per cent. The average results obtained were as follows: calcium oxide 50.44 per cent. equivalent to calcium carbonate 90.07 per cent.; magnesium oxide 2.68 per cent. equivalent to magnesium carbonate 5.62 per cent. The average size of sieve mesh through which the coarsest particles would pass was No. 10, the average results for fineness were as follows: Passing No. 10 mesh sieve 97.6 per cent., No. 50, 70.5 per cent. and No. 100 mesh sieve, 60.8 per cent. The sample containing the lowest amount of calcium oxide ran 37.25 per cent. and was abnormally low, as the shipment represented contained an excessive amount of water, 31.72 per cent. The one containing the highest amount of calcium oxide ran 55.43 per cent. equivalent to calcium carbonate 98.88 per cent. and was of the same brand as the one running low in calcium oxide. The selling price ranged from \$2.00 to \$8.50 per ton, with an average of \$6.34.

There were only 6 samples classified as Marl received and analyzed. This product is secured from the natural deposits of clay and is composed for the most part of carbonate of lime. The results of analyses showed very little variation in their composition. The calcium oxide ranged from 40.39 per cent. to 50.40 per cent. with an average of 46.03 per cent. equivalent to calcium carbonate 82.11 per cent. The magnesium oxide varied from 1.00 per cent. to 1.69 per cent. with an average of 1.36 per cent. equivalent to magnesium carbonate 2.85 per cent. The insoluble matter varied from 2.01 per cent. to 11.47 per cent. with an average of 6.05 per cent. The selling price varied from \$3.55 to \$7.50 and averaged \$5.79 per ton.

"Lime is the product obtained by the complete burning of limestone in a kiln, and capable of being reduced by slaking to a fine powder." There were 28 samples of this class received and analyzed. As a result of the burning process, most of the 44 per cent. of carbon dioxide is expelled and the amount of calcium and magnesium oxides combined with it is increased, thereby exceeding 56 per cent. The variations observed in the samples analyzed were as follows:—Lowest calcium oxide 50.84 per cent., highest 92.56 per cent., average 72.35 per cent. Lowest magnesium oxide 1.12 per cent., highest 23.63 per cent., average 4.18 per cent. The carbon dioxide ranged from .64 per cent. to 12.68 per cent. and averaged 6.21 per cent. Estimating the amount of carbonate of lime from the average content of carbon dioxide shows the average amount remaining as "core," a portion of

which many have been due to exposure to the atmosphere to be 14.13 per cent. The amount of insoluble matter varied from .40 per cent. to 10.40 per cent. and averaged 4.31 per cent. The selling prices were from \$2.50 to \$8.00 a ton and averaged \$4.72.

There were 72 samples of Hydrated Lime received representing 25 brands, being a greater number than of any other class. The product is defined as being "slaked-lime prepared by the aid of stirring, or of stirring, grinding, and screening machinery, and is free from hard lumps." When classed as "hydrated spraying lime" it should be of such a degree of fineness that all should pass a No. 100 mesh sieve. The results of analyses showed the following variations:—Lowest calcium oxide 42.63 per cent., highest 74.25 per cent., average 62.16 per cent. Lowest magnesium oxide .88 per cent., highest 33.73 per cent., average 9.09 per cent. The insoluble matter ranged from .28 per cent. to 9.77 per cent. with an average of 2.56 per cent. and the selling prices were from \$6.00 to \$8.10 a ton, averaging \$7.26.

There were only 4 samples of Gypsum or Land Plaster which contained from 23.24 per cent. to 39.17 per cent. of calcium oxide. Estimating these amounts as sulphate of lime, of which this class of material is largely composed, gives 56.42 per cent. and 95.09 per cent. respectively. The average content of insoluble matter was 9.71 per cent. and the selling prices, which were obtained in only two cases were \$12.00 a ton.

The one sample classed as Miscellaneous, was a mixture of pulverized limestone and hydrated lime and analyzed 38.16 per cent. calcium oxide and 27.23 per cent. magnesium oxide. The selling price was given as \$6.35 a ton.

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## LIME FACTORS

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In estimating the composition of the several classes of lime products, it is necessary to employ certain factors, which are derived from the chemical formulas representing them. As previously shown determinations are made for calcium oxide, magnesium oxide, carbon dioxide and sulphur trioxide. Carbonate of Lime is represented by

the formula  $\text{CaCO}_3$ , Carbonate of Magnesia by  $\text{MgCO}_3$ , Gypsum or Calcium Sulphate by  $\text{CaSO}_4$ , Hydrated Lime by  $\text{Ca}(\text{OH})_2$  and Magnesium Hydrate by  $\text{Mg}(\text{OH})_2$ . To estimate the amounts of Calcium Oxide and Magnesium Oxide in these forms, the results secured are multiplied by their respective factors. In order that these factors may be at hand for reference, they are included herewith as follows:—

Given.	Required.	Factor.
Calcium oxide, .....	Calcium hydrate, .....	1.321
Calcium oxide, .....	Calcium carbonate, .....	1.7839
Calcium oxide, .....	Calcium sulphate, .....	2.4265
Calcium hydrate, .....	Calcium oxide, .....	.7570
Calcium carbonate, .....	Calcium oxide, .....	.5606
Calcium sulphate, .....	Calcium oxide, .....	.4121
Magnesium oxide, .....	Magnesium hydrate, .....	1.4468
Magnesium oxide, .....	Magnesium carbonate, .....	2.0913
Magnesium hydrate, .....	Magnesium oxide, .....	.6912
Magnesium carbonate, .....	Magnesium oxide, .....	.4782
Calcium oxide, .....	Sulphur trioxide, .....	1.4265
Carbon dioxide, .....	Calcium carbonate, .....	2.2757
Calcium carbonate, .....	Carbon dioxide, .....	.4394
Sulphur trioxide, .....	Calcium sulphate, .....	1.701

TABLE No. I.—PULVERIZED LIMESTONE,

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture.	Calcium Oxide.	
				Found.	Guaranteed.
	GROUND LIMESTONE.		%	%	%
	THE ACME PULVERIZING AND STONE CO., LEBANON, PA.				
C-135	B. B. Brand, Ground Limestone,...	J. C. Harrington, Montrose, ..	0.09	41.64	54.00
C-50	B. B. Brand, Ground Limestone,...	W. H. Kepner, Newport, ....	0.52	46.24	54.00
	BESSEMER LIMESTONE CO., YOUNGSTOWN, OHIO.				
C-73	Bessemer Pulverized Limestone, ...	B. S. McFarland, Ambridge,...	0.25	45.53	.....
C-175	Bessemer Pulverized Limestone, ...	R. R. Douglass, Enou Valley,	0.15	46.47	.....
	THE CARBON LIMESTONE CO., YOUNGSTOWN, OHIO.				
C-180	Carbon Limestone, .....	R. G. Allison, Ambridge, .....	0.18	44.36	47.00
	CHEMICAL LIME CO., BELLE-FONTE, PA.				
C-118	Agricultural Ground Limestone, ...	E. M. Fullington, Clearfield,...	0.38	50.52	.....
	CLYDSDALE BRICK & STONE CO., PITTSBURGH, PA.				
C-95	Pulverized Agricultural Limestone, ..	John H. Cheeseman, Finleyville,	0.18	48.57	45.00
C-7	Pulverized Agricultural Limestone, ..	Stoup & Baker, Valencia, ....	0.10	48.52	45.00
	F. E. CONLEY LIME AND FERTILIZER CO., UTICA, N. Y.				
C-14	Raw Ground Lime (ground limestone).	Wysox Produce Co., Wysox, .	0.08	52.97	51.50
	O. DERFLINGER & SON, BOSWELL, PA.				
C-82	Pulverized Lime, .....	O. Derflinger & Son, Boswell,	0.25	49.12	.....
	EDISON PULVERIZED LIMESTONE CO., STEWARTSVILLE, N. J.				
C-169	Edison Pulverized Limestone, .....	Adolph Boettinger, Danville,...	0.05	49.20	48.50
C-21	Edison Pulverized Limestone, .....	T. S. Parker, Clarks Green, ..	0.09	49.67	48.50
C-63	Edison Pulverized Limestone, .....	H. Z. Pride & Son, Westfield,	0.09	49.82	48.50
C-159	Edison Pulverized Limestone, .....	A. F. Smith, Conyngham, ....	0.09	49.04	48.50
C-23	Edison Pulverized Limestone, .....	Amos Snyder, Hegins, .....	0.12	50.25	48.50
C-134	Edison Pulverized Limestone, .....	E. B. Vail, Jermyn, .....	0.15	49.91	48.50
	G. W. JOHNSON LIMESTONE CO., NEW CASTLE, PA.				
C-179	Johnson's Pulverized Limestone, ..	City Coal Co., Meadville, ....	0.13	47.72	47.60
C-57	Johnson's Pulverized Limestone, ..	W. D. Frisbee, Tidionte, .....	0.04	45.74	47.60
C-71	Johnson's Pulverized Limestone, ..	A. Miller & Co., Greenville,...	0.16	48.11	47.60
C-6	Johnson's Pulverized Limestone, ..	Morrow & Buxton, Valencia,...	0.13	48.88	47.60
	E. J. LAVINO & CO., PHILADELPHIA, PA.				
C-40	White Marsh Pulverized Limestone,	William I. Fehr, Pine Grove, ..	0.02	29.82	25.00
C-171	White Marsh Pulverized Limestone,	H. Schmaltz, Kennett Square,	0.00	30.50	25.00
	LEHIGH PULVERIZED LIMESTONE CO., ALLENTOWN, PA.				
C-32	Lehigh Brand Pulverized Limestone,	Robert A. Reichard, Allentown,	0.13	28.43	27.50
C-143	Lehigh Brand Pulverized Limestone,	W. H. Stoub, Agt., Pine Grove,	0.03	28.56	27.50
	PALMER LIME AND CEMENT CO., YORK, PA.				
C-49	Ground Limestone, .....	B. F. Horting, Newport, .....	0.12	48.30	52.00
C-139	Ground Limestone, .....	E. A. and J. L. Pennock, Chatbam.	0.24	48.43	52.00

## ARTIFICIAL CARBONATE OF LIME AND MARL.

Calcium carbonate.		Magnesium oxide.		Magnesium carbonate.		Insoluble matter.	Fineness.					Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.		Coarsest particles pass sieve mesh No. ....		Amount of sample passing sieve meshes.				
							Found.	Guaranteed.	10 mesh.	50 mesh.	100 mesh.		
%	%	%	%	%	%	%	No.	No.	%	%	%	\$	
74.28	96.00	9.02	2.00	18.86	.....	8.76	20	.....	100.0	70.8	53.2	6.00	C-135
82.49	96.00	6.23	2.00	13.03	.....	6.13	10	.....	100.0	65.6	52.4	6.50	C-50
81.22	85.00	1.42	.....	2.97	1.50	13.75	10	10	100.0	88.0	75.2	4.00	C-73
82.89	85.00	0.83	.....	1.74	1.50	11.75	10	10	100.0	85.2	68.8	2.50	C-175
79.13	85.00	0.83	0.60	1.74	.....	15.20	5	1/10	92.4	71.2	59.2	4.25	C-180
90.12	95.00	1.54	.....	2.93	1.00	7.88	20	40	100.0	65.2	44.4	5.00	C-118
86.55	84-90	0.89	1.00	1.76	.....	11.32	20	1/24	100.0	92.4	79.2	3.04	C-95
86.55	84-90	0.89	1.00	1.76	.....	11.32	20	1/24	100.0	83.2	77.6	3.25	C-7
95.48	95.50	0.64	1.30	1.35	2.30	2.47	10	.078	100.0	40.0	26.8	5.00	C-14
87.62	.....	2.56	.....	5.35	.....	6.32	5	.....	91.2	39.2	27.2	2.50	C-82
87.77	90.00	1.45	1.90	3.03	3.00	7.50	30	10	100.0	99.6	85.6	4.50	C-169
88.61	90.00	1.96	1.90	4.10	3.00	4.84	30	10	100.0	99.6	91.6	3.40	C-21
88.87	90.00	1.52	1.90	3.13	3.00	7.11	40	10	100.0	99.6	90.8	6.00	C-63
87.49	90.00	1.56	1.90	3.26	3.00	7.65	40	10	100.0	99.6	91.6	.....	C-159
89.64	90.00	2.41	1.90	5.04	2.00	6.00	30	10	100.0	99.2	90.0	.....	C-32
89.03	90.00	1.77	1.90	3.70	3.00	6.25	20	10	100.0	90.6	92.4	.....	C-134
85.13	85.00	0.65	0.84	1.36	1.50	10.40	5	1/10	96.0	84.0	72.0	2.45	C-179
81.60	85.00	1.42	0.84	2.97	1.50	14.53	5	1/10	98.0	92.6	86.4	3.25	C-57
85.82	85.00	0.76	0.84	1.59	1.50	9.65	5	1/10	98.0	94.4	83.6	2.95	C-71
87.19	85.00	0.77	0.84	1.61	1.50	11.03	5	1/10	99.6	94.8	72.8	3.09	C-6
53.19	.....	19.92	18.00	41.66	.....	3.63	5	1/16	99.6	80.0	70.0	.....	C-40
54.41	.....	21.11	18.00	44.15	.....	2.70	10	1/16	100.0	76.4	66.8	3.70	C-171
50.71	47.43	18.22	19.47	33.10	40.75	8.70	10	10	100.0	83.2	71.2	7.00	C-32
50.95	47.43	19.54	19.47	40.85	40.75	7.90	10	10	100.0	83.0	81.2	.....	C-143
86.16	.....	6.87	3.00	13.87	.....	0.71	5	20	99.6	79.0	64.0	3.45	C-49
86.40	.....	6.11	3.00	13.12	.....	2.28	5	20	98.8	73.4	62.0	4.00	C-130



TABLE NO. 1.—PULVERIZED LIMESONE, ARTIFICIAL

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture.	Calcium Oxide.	
				Found.	Guaranteed.
C-13	ROCK CUT STONE CO., SYRACUSE, N. Y. Rock Cut Brand Ground Limestone.	John A. Williams, Little Meadows.	% 0.29	% 37.62	% 25.00
C-155	SECURITY CEMENT AND LIME CO., HAGERSTOWN, MD. Berkeley Ground Limestone. ....	Wm. A. Nickles, Shippensburg.	0.05	48.13	44.00
C-121	SHENANGO LIMESTONE CO., NEW CASTLE, PA. Shenango Pulverized Raw Limestone.	The People's Planing Mill Co., Punxsutawney.	0.32	49.86	47.60
C-137	THE SOLVAY PROCESS CO., SYRACUSE, N. Y. Solvay Pulverized Limestone. ....	James Hickey, Apalachin, N.Y.	0.26	49.70	51.20
C-24	THOMASVILLE STONE & LIME CO., THOMASVILLE, PA. Ground Limestone. ....	The I. W. Scott Co., Pittsburgh. Average, .....	0.08 0.15	54.14 45.67	..... .....
ARTIFICIAL CARBONATE OF LIME.					
THE COLUMBIA PRODUCTS CO., CLEVELAND, OHIO.					
C-67	Plant Lime, .....	T. R. Bolton, Agt., Cochranton,	0.31	50.55	45.00
C-177	Plant Lime, .....	F. F. Harrison, Edinboro, ....	0.33	49.33	45.00
C-26	Plant Lime, .....	The Hegner Emporium, Scwickley.	0.16	45.07	45.00
C-147	Plant Lime, .....	Krause & Frehling, Marwood,	0.10	50.61	45.00
C-66	Plant Lime, .....	A. T. Larson, Kane, .....	0.86	49.50	45.00
C-122	Plant Lime, .....	John A. Magee & Son, Clarion,	0.68	47.78	45.00
C-185	Plant Lime, .....	Magill & Cowau, Corsica, ....	0.40	48.46	45.00
C-8	Plant Lime, .....	Mars Milling & Feed Co., Mars,	0.17	50.95	45.00
C-9	Plant Lime, .....	George Walter & Sons, Butler,	0.03	51.09	45.00
INDUSTRIAL CHEMICAL CO., NEW YORK, N. Y.					
C-30	Precipitated Agricultural Lime. ....	J. Harvey Miller, Ligonier, ...	0.59	53.74	53.43
C-28	Precipitated Agricultural Lime. ....	The EH Sell Co., Greensburg,	0.53	52.71	53.43
C-106	Precipitated Agricultural Lime. ....	E. A. Slagle, Paxinos, .....	0.83	52.70	53.43
C-48	Precipitated Agricultural Lime. ....	R. J. Walton, Hummelstown, ..	0.40	53.00	53.43
C-45	KEASBEY & MATTISON CO., AMBLER, PA. Agricultural Lime (artificial carbonate of lime).	E. Gerhart & Son, Jonestown.	*12.13	*37.50	30.00
C-61	MAYBURG ACETONE CO., MAYBURG, PA. Mayburg "Carbonate of Lime," ...	Mayburg Acetone Co., Mayburg,	0.37	52.75	.....
C-184	MELVILLE-CORBETT CO., ST. MARYS, PA. Lime for the farm, .....	Peter B. Cowan, Brookville, ..	0.50	52.83	54.00
C-65	Lime for the farm, .....	William M. Farnham, Smethport.	*14.56	45.25	54.00
NORWICH CHEMICAL CO., EAST SMETHPORT, PA.					
C-62	Norwich Carbonate of Lime. ....	Wm. M. Farnham, Smethport,	*31.72	*37.25	54.93
C-64	Norwich Carbonate of Lime. ....	Wm. M. Farnham, Smethport,	0.40	55.43	54.93
C-68	OHIO FARMERS' LIME CO., CLEVELAND, OHIO. Ohio Farmers' Lime, .....	P. F. Schall, Cochranton, ....	0.35	50.94	45.00

## CARBONATE OF LIME AND MARL—Continued.

Calcium carbonate.		Magnesium oxide.		Magnesium carbonate.		Insoluble matter.	Fineness.					Selling price per ton at place of selection.	Chemist's number.
Found.	Guaranteed.	Found.	Guaranteed.	Found.	Guaranteed.		Coarsest particles pass sieve mesh No.....		Amount of sample passing sieve meshes.				
							Found.	Guaranteed.	10 mesh.	50 mesh.	100 mesh.		
%	%	%	%	%	%	%	No.	No.	%	%	%	\$	
67.11	90.00	6.42	.....	13.45	.....	12.31	10	10	100.0	46.8	36.0	3.60	C-13
85.86	80.00	3.98	.....	8.32	.....	4.60	10	20	100.0	74.0	57.6	3.50	C-155
88.87	85.00	1.17	0.62	2.35	1.60	7.61	30	10	100.0	94.0	81.2	4.50	C-121
88.66	94.00	2.53	1.50	5.29	.....	6.15	10	20	100.0	97.2	84.8	3.80	C-127
96.58	97.00	2.40	.....	5.02	2.50	0.10	10	20	100.0	74.8	66.0	5.50	C-24
81.50	.....	4.76	.....	9.93	.....	7.57	15	.....	99.1	81.6	69.7	4.14	.....
90.18	80.00	3.57	5.00	7.47	11.00	0.96	10	10	100.0	77.2	68.2	6.52	C-67
88.00	80.00	3.11	5.00	6.51	11.00	1.05	10	10	100.0	72.4	62.0	8.00	C-177
80.40	80.00	8.56	5.00	17.92	11.00	1.18	10	10	100.0	77.2	67.6	8.50	C-26
90.28	80.00	3.25	5.00	6.96	11.00	1.20	10	10	100.0	86.4	72.8	7.50	C-147
88.30	80.00	3.22	5.00	6.73	11.00	1.09	10	10	100.0	75.2	66.8	7.00	C-66
87.02	80.00	2.82	5.00	5.90	11.00	2.90	10	10	100.0	75.2	66.8	7.00	C-122
86.45	80.00	3.15	5.00	6.59	11.00	1.15	10	10	100.0	72.0	62.0	8.00	C-185
90.87	80.00	3.26	5.00	6.81	11.00	1.51	10	10	100.0	78.0	69.2	6.75	C-8
91.14	80.00	2.20	5.00	6.69	11.00	2.05	10	10	100.0	78.0	68.4	7.50	C-9
95.87	95.41	1.55	0.92	3.24	1.93	1.02	10	20	100.0	95.2	93.2	7.00	C-30
95.81	95.41	1.43	0.92	2.99	1.93	0.94	20	20	100.0	96.4	94.8	7.50	C-28
94.01	95.41	1.72	0.92	3.60	1.93	1.77	10	20	100.0	88.4	84.8	7.25	C-106
94.54	95.41	0.98	0.92	2.05	1.93	1.28	20	20	100.0	96.4	94.8	.....	C-48
*66.90	.....	*8.51	6.00	*17.81	.....	1.70	10	25	100.0	83.6	68.8	7.00	C-45
94.10	96.44	1.13	.....	2.36	1.44	4.06	.....	.....	85.6	25.2	14.0	2.00	C-61
94.25	.....	1.27	0.99	2.65	.....	0.93	5	1/4	91.6	28.0	15.2	3.00	C-184
80.72	97.14	2.06	0.90	4.31	1.43	0.84	5	1/4	89.6	33.6	20.0	2.00	C-65
*66.45	.....	1.09	0.95	2.28	.....	0.17	5	1/2	90.4	31.6	18.8	.....	C-62
98.88	.....	0.65	0.95	1.36	.....	0.13	5	1/2	92.0	38.8	22.8	4.50	C-64
90.87	80.00	3.62	5.00	7.57	.....	1.69	5	.....	99.6	72.0	63.2	6.50	C-68

\*Excluded from average.

TABLE NO. 1.—PULVERIZED LIMESTONE ARTIFICIAL

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Moisture.	Calcium Oxide.	
				Found.	Guaranteed.
			%	%	%
C-126	PHILADELPHIA LIME CO., INC., PHILADELPHIA, PA.				
	Prepared Lime, .....	Richard B. Jackson, Cochran- ville.	2.66	44.60	45.00
	MARL.	Average, .....	0.53	50.44	.....
C-15	CALEDONIA CHEMICAL CO., CALEDONIA, N. Y.				
	Better Farming Lime, .....	C. B. Eastabrook, Rummer- field.	1.53	50.34	50.00
C-59 C-69 C-178	CONNEAUT LAKE MARL CO., HARMONSBURG, PA.				
	Conneaut Marl-Lime, .....	F. J. Cobben, West Hickory...	1.51	42.91	50.00
	Conneaut Marl-Lime, .....	J. R. Hanks, Springboro, ....	8.86	40.33	50.00
	Conneaut Marl-Lime, .....	J. R. Hanks, Springboro, ....	1.33	45.70	50.00
C-139 C-112	INTERNATIONAL AGRICULTUR- AL CORPORATION, CALE- DONIA, N. Y.				
	Lime Carbonate-Marl, .....	E. B. Arnold, Athens, .....	8.53	46.42	50.00
	Lime Carbonate-Marl, .....	H. A. Snyder, Strawburg Ridge.	0.12	50.40	50.00
		Average, .....	3.64	46.03	.....





TABLE NO. II.—LIME AND HYDRATED LIME.

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Calcium Oxide.		Magnesium Oxide.		Carbon di-oxide.	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
			Found.	(Guaranteed.	Found.	(Guaranteed.				
LIME.										
C-119	AMERICAN LIME AND STONE CO., TY- RONE, PA.	Curwensville Hardware Co., Curwensville. American Lime and Stone Co., Tyrone.	81.09	90.00	3.17	.....	0.61	6.90	4.28	C-119
C-117	No. 1 Agricultural Lime, Lump Lime,		83.72	.....	2.35	.....	4.36	2.29	3.00	C-117
C-116	DUNCANSVILLE LIME AND LIMESTONE CO., DUNOANSVILLE, PA. Agricultural Lime,	Duncansville Lime and Limestone Co., Duncansville.	82.97	85.89	2.57	1.68	5.12	4.57	3.14	C-116
C-101	M. J. GROVE LIME CO., LIME KILN, MD. Famous Frederick County Agricultural Lime.	J. D. Gochenour, Dillsburg.	61.69	70.00	2.25	1.00	5.88	4.67	6.50	C-101
C-169	Famous Frederick County Agricultural Lime.	M. J. Grove Lime Co., Lime Kiln, Md.,	71.13	70.00	9.91	1.00	5.40	4.35	7.00	C-169
C-78	Famous Frederick County Agricultural Lime.	H. S. Newcomer, Mt. Joy.	63.23	70.00	1.77	1.00	4.00	8.25	6.39	C-78
C-88	Raw Ground Limestone,	M. R. Thomas, Somerfield,	74.95	75.00	1.38	.....	6.60	6.83	7.00	C-88
C-82	J. W. HANKS, FRIEDENS, PA. I. X. L. Burned Run of Kiln Agricultural Lime.	J. W. Hanks, Friedens,	78.33	82.91	1.94	1.53	2.23	9.01	2.59	C-82
C-167	LUTHER KELLER, SCRANTON, PA. Keller Lump Agricultural Lime,	Chris Hester, Portland,	65.45	52.00	5.14	3.00	6.80	1.85	3.14	C-167
C-113	Keller Lump Agricultural Lime.	Luther Keller, Portland,	51.15	52.00	23.63	3.00	1.76	3.45	3.00	C-113

C-172	THE KELLEY ISLAND LIME AND TRANS- PORT CO., CLEVELAND, OHIO. Tiger Brand Agricultural Ground Quicklime, ...	Wysox Produce Co., Wysox, .....	59.30	64.00	14.66	18.00	7.70	0.90	8.00	C-172
C-87 C-189 C-162	KEYSTONE LIME CO., ELK LICK, PA. Alfalfa Brand Granulated Burned Lime, ..... Alfalfa Brand Granulated Burned Lime, ..... Alfalfa Brand Granulated Burned Lime, .....	P. A. Brugh, Rockwood, Keystone Lime Co., Elk Lick, James W. Lemmon, Saltsburg, .....	71.01 71.99 69.19	73.50 73.50 73.50	3.19 3.87 3.44	1.50 1.50 1.50	9.41 8.80 11.00	3.51 3.00 4.40	..... 5.00 6.00	C-87 C-189 C-162
C-16	HENRY KILGUS, MUNCY, PA. Freshly Burned Lump Lime, .....	N. J. Norton, New Albany, .....	73.63	85.00	1.76	1.00	5.32	0.83	3.80	C-16
C-174 C-18	W. E. McCONNELL, HUGHESVILLE, PA. Freshly Burned Lump Lime, .....	O. L. Porter, Shunk, Wyalusing Hay Co., Wyalusing, .....	85.10 81.21	85.00 85.00	1.25 2.80	1.00 1.00	3.04 3.56	1.03 1.60	3.75 3.80	C-174 C-18
C-141	NORTHERN CENTRAL LIME CO., WIL- LIAMSPORT, PA. Lycu Agricultural Lump Lime, .....	G. B. Sheppard, Alba, .....	50.84	81.60	3.09	4.00	11.04	1.77	3.65	C-141
C-37	M. E. REEDER, MUNCY, PA. Chippewa Lump Lime, .....	Win. Krause, Agt., Dallas, .....	73.85	85.00	1.70	1.00	12.68	6.38	3.70	C-37
C-164 C-55	ROSE POINT STONE AND LIME CO., NEW CASTLE, PA. Rose Point Ground Burned Lime, ..... Rose Point Ground Burned Lime, .....	I. W. Gibson, Indiana, D. L. Young, Youngville, .....	66.03 68.80	88.00 88.00	1.12 1.84	1.00 1.00	8.90 7.98	6.65 7.62	6.50 5.85	C-164 C-55
C-34	RUTHERFORD BROTHERS, PAXTANG, PA. Run of Kiln Lime, .....	A. E. Willier, Hegins, .....	62.03	66.10	12.73	11.63	7.29	7.20	3.50	C-34
C-128	SECURITY CEMENT AND LIME CO., HAG- ERSTOWN, MD. Berkeley Ground Lime, .....	Colburn & Young, Aurora, .....	82.57	90.00	2.28	3.00	10.63	0.99	.....	C-128
C-156	WILLIAM SPANGLER, NEWVILLE, PA. Spangler's Fresh Burned Ground Lime, .....	William Spangler, Newville, .....	63.46	82.57	2.93	2.59	12.20	10.40	.....	C-156
C-108	CHARLES SUMMERS, BLOOMSBURG, PA. Lump Lime, .....	W. B. Goodhart, Catawissa, .....	81.23	80.75	1.56	1.74	6.66	6.75	5.71	C-108
C-46	G. M. WEIK, LEBANON, PA. Lumber Lime, .....	Horace Hess, Pine Grove, .....	68.63	90.00	2.30	.....	1.40	4.75	.....	C-46
C-1 C-18	WHITEROCK QUARRIES, BELLEFONTE, PA. Lump Lime, ..... Lump Lime, .....	E. M. Fullington, Clearfield, H. M. Gooderhan, Patton, .....	92.56 86.01	92.81 92.81	1.52 1.38	0.82 0.82	0.70 2.76	0.48 0.40	4.56 4.67	C-1 C-182
	Average, .....		72.35	.....	4.18	.....	6.21	4.31	4.72	.....

TABLE NO. II.—LIME AND HYDRATED LIME—Continued.

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Calcium Oxide.		Magnesium Oxide.		Carbon di-oxide.	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
			Found.	Guaranteed.	Found.	Guaranteed.				
HYDRATED LIME.										
C-93	THE AGRICULTURAL AND COMMERCIAL LIME CO., CANTON, OHIO. Cerealime, Hydrate, .....	T. H. McCombs, Venetia, .....	57.83	60.00	1.52	1.50	.....	5.80	.....	C-93
C-115	AMERICAN LIME AND STONE CO., TYRONE, PA. Hydra-Oxide of Lime, .....	American Lime and Stone Co., Tyrone, .....	65.94	67.50	2.68	.....	.....	1.58	.....	C-115
C-56	Hydra-Oxide of Lime, .....	Albert Hultberg, Chandler Valley, .....	69.73	67.50	1.52	.....	.....	1.56	7.60	C-56
C-103	Hydra-Oxide of Lime, .....	Myers & Slonaker, Hughesville, .....	67.82	67.50	2.95	.....	.....	2.08	.....	C-103
C-163	Hydra-Oxide of Lime, .....	The Ehl Sell Co., Greensburg, .....	67.63	67.50	1.49	.....	.....	2.20	8.00	C-163
C-19	Hydra-Oxide of Lime, .....	C. B. Tyler, Meshoppen, .....	68.98	67.50	1.99	.....	.....	1.81	.....	C-19
C-127	S. W. BARRICK & SONS, WOODSBORO, MD. Barrick's Hydrated Lime, .....	J. C. Emery & Co., Nottingham, .....	59.22	56.00	2.32	2.00	.....	5.07	7.50	C-127
C-12	BEAVER VALLEY LIME CO., NEW CASTLE, PA. Beaver Hydrated Lime, .....	J. J. Kennedy, Zellenonle, .....	57.58	55.00	1.07	0.80	.....	4.73	6.00	C-12
C-70	Beaver Hydrated Lime, .....	G. D. Ramsey & Son, New Castle, .....	58.18	55.00	1.25	0.80	.....	4.77	6.50	C-70

C-51	BLAIR LIMESTONE CO., MARTINSBURG, W. VA. Hydrated Lime, .....	C. F. Gelbach, Duncannon, .....	65.52	65.00	2.69	2.00	.....	5.46	6.00	C-51
C-33	Opequon Hydrated Lime, .....	Amos Hance, Muremburg, .....	65.53	65.00	2.25	2.00	.....	5.26	6.00	C-38
C-29	Opequon Hydrated Lime, .....	The Loucks Hardware Co., Scottsdale, .....	65.55	65.00	2.33	2.00	.....	5.62	8.00	C-29
C-84	Opequon Hydrated Lime, .....	S. S. Ream, Somerset, .....	66.46	65.00	2.19	2.00	.....	5.03	.....	C-84
C-105	Opequon Hydrated Lime, .....	Reed & Erdman, Paxinos, .....	67.28	65.00	2.42	2.00	.....	4.58	7.00	C-105
C-154	Opequon Hydrated Lime, .....	W. H. Shautterbock, Millfintown, .....	68.15	65.00	3.14	2.00	.....	4.40	6.50	C-154
C-150	CENTRE COUNTY LIME CO., BELLEFONTE, PA. Hydrated Drilling Lime, .....	E. A. Slagle, Paxinos, .....	67.17	67.00	1.38	1.00	.....	2.00	7.00	C-150
C-129	G. AND W. H. CORSON, PLYMOUTH MEET- ING, PA. Corson's Prepared Lime (Hydrated), .....	R. C. Fairlamb & Son, Brandywine Summit, .....	42.63	42.00	30.25	27.00	.....	3.86	8.00	C-129
C-77	DETRICK BROTHERS, READING, PA. Detrick's Gold Medal Brand Hydrated Lime, .....	H. Summy, Landisville, .....	46.16	46.00	27.78	34.00	.....	2.76	6.50	C-77
C-176	THE KELLEY ISLAND LIME AND TRANS- PORT CO., CLEVELAND, OHIO. Tiger Brand Agricultural Hydrated Lime, ....	Davison & Weller, Union City, .....	60.31	54.00	13.17	16.00	.....	1.45	7.00	C-176
C-91	Tiger Brand Agricultural Hydrated Lime, ....	W. H. Dunlap, Jr., Canonsburg, .....	59.96	54.00	16.39	16.00	.....	1.28	7.00	C-91
C-72	Tiger Brand Agricultural Hydrated Lime, ....	Lanesville Coal, Lime and Cement Co., Lanesville, .....	58.92	54.00	17.42	16.00	.....	1.12	6.50	C-72
C-4	Tiger Brand Agricultural Hydrated Lime, ....	James McCullough, Jr., Kittanning, .....	65.98	54.00	11.26	16.00	.....	1.01	8.00	C-4
C-27	Tiger Brand Agricultural Hydrated Lime, ....	McFarland Supply Co., Greensburg, .....	65.10	54.00	17.62	16.00	.....	0.90	7.50	C-27
C-35	KNICKERBOCKER LIME CO., PHILADEL- PHIA, PA. Knickerbucker Hydrated Lime, .....	Kamerer Hardware Co., Lehighton, .....	47.62	45.00	31.11	30.00	.....	1.12	7.50	C-35
C-39	Knickerbocker Hydrated Lime, .....	Lakeside Grange, Barnesville, .....	47.60	45.00	29.61	30.00	.....	1.32	7.10	C-39
C-170	Knickerbocker Hydrated Lime, .....	J. P. Stoltzfus Co., Elverson, .....	46.46	45.00	30.28	30.00	.....	1.30	8.00	C-170
C-111	LE GORE COMBINATION LIME CO., LE- GORE, MD. LeGore's Refined Hydrated Lime, .....	I. G. Washburn, Millville, .....	57.17	55.00	4.92	0.50	.....	9.77	8.00	C-111
C-140	NORTHERN CENTRAL LIME CO., WIL- LIAMSPORT, PA. Lycor Agricultural Hydrated Lime, .....	P. R. English, Granville Summit, .....	65.15	73.00	3.46	2.00	.....	3.38	7.00	C-140
C-10	THE OHIO AND WESTERN LIME CO., HUNTINGDON, IND. Hydrated Agricultural Lime, .....	Enos Barkey, Evans City, .....	48.48	46.00	31.88	31.00	.....	1.91	7.50	C-10
C-25	JOHN D. OWENS & SON CO., OWENS, OHIO, Clover Leaf Brand Hydrated Agricultural Lime, .....	John Lachman, Hays, .....	57.45	55.00	13.83	12.00	.....	1.50	7.50	C-25





ROSE POINT STONE AND LIME CO., NEW CASTLE, PA.									
C-58	Peerless Hydrated Lime.	T. J. Bowman Est., East Hickory.	55.85	60.00	1.59	1.00	.....	5.86	7.50
C-120	Peerless Hydrated Lime.	Hilfner-Hoover Hardware Co., DuBols.	56.09	60.00	0.83	1.00	.....	8.00	C-120
C-60	Peerless Hydrated Lime.	Lanson Brothers, Thonesta.	60.81	60.00	1.03	1.00	.....	5.17	C-60
C-3	Peerless Hydrated Lime.	Leechburg Hardware Co., Leechburg.	61.84	60.00	1.26	1.00	.....	5.37	C-3
C-181	Rose Point Hydrated Lime.	Marshall Brothers, New Castle.	56.70	60.00	0.98	1.00	.....	6.05	C-181
C-94	Peerless Hydrated Lime.	J. H. McMurray, Canonsburg.	63.10	60.00	1.30	1.00	.....	5.01	C-94
SECURITY CEMENT AND LIME CO., HAGERS TOWN, MD.									
C-132	Berkeley Hydrated Lime.	W. W. Book, Port Royal.	69.22	70.00	4.24	2.00	.....	2.05	C-132
C-153	Berkeley Hydrated Lime.	S. A. Fishburn, Penbrook.	70.68	70.00	1.81	2.00	.....	0.40	C-153
C-11	Berkeley Hydrated Lime.	A. H. Krauf, Harmony.	74.25	70.00	2.40	2.00	.....	0.32	C-11
C-5	Berkeley Hydrated Lime.	Morrow & Buxton, Valencia.	73.85	70.00	2.35	2.00	.....	0.06	C-5
C-41	Berkeley Hydrated Lime.	Mt. Holly Feed and Grain Co., Mt. Holly.	69.69	70.00	1.19	2.00	.....	0.28	C-41
C-98	Berkeley Hydrated Lime.	J. Ross Scarborough & Son, Delta.	70.02	70.00	2.88	2.00	.....	0.65	C-98
C-131	Berkeley Hydrated Lime.	H. G. Shortridge, Keiton.	69.68	70.00	2.46	2.00	.....	2.89	C-131
STANDARD LIME AND STONE CO., BUCKEYSTOWN, MD.									
C-90	Standard Hydrated Lime.	G. B. Sprowls, Claysville.	69.92	70.00	1.96	2.00	.....	2.68	C-90
STEACY & WILTON CO., WRIGHTSVILLE, PA.									
C-76	Sterling Brand Hydrated Lime.	Paer & Son, Salunga.	68.01	70.00	5.58	2.00	.....	1.80	C-76
C-47	Sterling Brand Hydrated Lime.	F. G. Boyer, Millersburg.	68.85	70.00	2.42	2.00	.....	1.36	C-47
C-145	Sterling Brand Hydrated Lime.	H. S. Newcomer, Mt. Joy.	66.84	70.00	5.76	2.00	.....	1.65	C-145
C-144	Sterling Brand Hydrated Lime.	John Ulrich, Littlestown.	67.38	70.00	4.49	2.00	.....	1.65	C-144
THE TIDEWATER PORTLAND CEMENT CO., BALTIMORE, MD.									
C-42	Tidewater Hydrated Lime.	W. H. Fogelsonger, Shippensburg.	72.12	71.00	1.59	0.50	.....	1.36	C-42
C-99	Tidewater Hydrated Lime.	Grove & Uffelman, Parke.	72.51	71.00	1.38	0.50	.....	0.95	C-99
CHARLES WARNER CO., WILMINGTON, DEL.									
C-23	Limoid (Hydrated Lime).	Abington Lumber Co., Dalton.	47.07	46.00	31.60	32.00	.....	0.88	C-23
C-36	Limoid (Hydrated Lime).	T. S. Bathert, New Ringgold.	47.10	46.00	33.73	32.00	.....	0.68	C-36
C-74	Limoid (Hydrated Lime).	I. G. Hall, New Providence.	47.76	46.00	32.70	32.00	.....	1.08	C-74
C-79	Limoid (Hydrated Lime).	M. K. Keith & Son, Wernersville.	50.62	46.00	30.85	32.00	.....	1.33	C-79
C-157	Limoid (Hydrated Lime).	A. F. Kimmel, Orwigsburg.	47.22	46.00	32.68	32.00	.....	1.00	C-157
C-146	Limoid (Hydrated Lime).	Miller & Rushong, Rohrertown.	47.49	46.00	31.47	32.00	.....	0.70	C-146
C-123	Limoid (Hydrated Lime).	E. C. Thomas, Plumsteadville.	46.65	46.00	27.48	32.00	.....	1.39	C-123
Average.			62.16	.....	9.09	.....	.....	2.56	.....

TABLE No. III.—GYPSUM OR LAND-PLASTER.

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Calcium Oxide.		Sulphur Tri-Oxide.		Gypsum (Estimated $\text{CaSO}_4$ ).	Insoluble matter.	Selling price per ton at place of selection.	Chemist's number.
			Found.	Guaranteed.	Found.	Guaranteed.				
C-104	THE AMERICAN AGRICULTURAL-CHEMICAL CO., NEW YORK, N. Y. Fine Ground Nova Scotia Plaster, .....	J. A. Goss, Sunbury. ....	4.49	39.17	51.76	47.09	95.09	0.64	.....	C-104
C-96	BAUGH & SONS CO., PHILADELPHIA, PA. Baugh's Genuine Nova Scotia Land Plaster.	Milton Nieman, Dover, .....	4.03	23.24	28.37	49.17	56.42	26.38	12.00	C-96
C-136	NIAGARA GYPSUM CO., OAKFIELD, N. Y. Niagara Land Plaster, .....	O. P. Beebe, Montrose, .....	13.74	32.84	44.49	42.00	79.72	0.90	.....	C-136
C-97	PATAPSCO GUANO CO., BALTIMORE, MD. Fine Ground Nova Scotia Plaster, .....	J. N. Hersh, New Oxford, .....	5.31	37.70	48.12	47.00	91.52	1.92	12.00	C-97
		Average, .....	6.89	33.24	43.19	.....	80.69	9.71	12.00	.....



TABLE No. IV.—MISCELLANEOUS SAMPLES.

Chemist's number.	Name of Manufacturer and Brand.	Sample Taken From—	Calcium Oxide.		Magnesium Oxide.		Insoluble matter.		Fineness.... Sieve Mesh Coarsest Particles Pass.		Selling price per ton at place of selection.		Chemist's number.
			Found.	Guaranteed.	Found.	Guaranteed.	%	%	Found.	Guaranteed.	\$	%	
C-20	CHARLES WARNER COMPANY, WIL- MINGTON, DEL. Warner's 50-50 Lime, .....	J. L. Coons, Bald Mount, .....	38.16	30.0	27.23	30.00	2.43		10	10	6.25		C-20

